kite-expedition in the South Atlantic was fully approved, and the hope was expressed that, with the aid of Government funds, the project might be realised in the near future. Mr. Berson remarked that it was of the greatest importance that the British as well as the Dutch Governments should encourage meteorological observations in the monsoon region, and Major Trollope, speaking for Great Britain, said that he would endeavour to have this done.

M. Teisserenc de Bort showed a diagram of the results obtained from continuous soundings of the atmosphere, or those made as frequently as possible at his observatory at Trappes, viz., on thirty-six days in January and February, 1901, when kites and registration balloons (*ballons-sondes*) were sent almost daily into the higher atmosphere to an extreme height of 12,000 metres. The plotted results throw doubt on the assumption that the barometric depressions bring higher temperatures and the barometric maxima lower temperatures, and give an interesting demonstration of the diversity and complexity of the atmospheric phenomena of which it is the aim of international aëronautics to ascertain the laws.

The fourth meeting was principally occupied with the subject of high ascents, and an apparatus for breathing oxygen at great altitudes was shown by Prof. Cailletet.

Dr. Süring spoke on the ascension which he had made with Mr. Berson on July 31, 1901, to the height of 10,800 metres, the greatest height yet reached by man. He insisted upon the importance of such high ascents to control the observations otherwise obtained and to make those that require direct vision. Especially are the strata from 5000 to 10,000 metres not yet adequately explored, and for weather changes they are of great importance, as is indicated by the scarcity of clouds near 4000 metres and above 6000 metres.

Lieutenant von Lucanus, in the name of the German Ornithological Society, asked aëronauts to observe the various heights at which birds are found. It is now supposed that the height above the ground at which birds fly does not generally exceed 400 metres, and only occasionally reaches 2000 metres, the zone usually remaining below the lower clouds. Still, much uncertainty prevails concerning the tracks of birds, and especially the heights of flights, and information is greatly desired.

The fifth session was mostly devoted to a discussion of observations of atmospheric electricity and terrestrial magnetism in balloons. Prof. Hergesell explained that electrical measurements are of such vital interest that the academies of Berlin, Munich, Göttingen, Leipzig and Vienna were to have been represented at this meeting by Profs. von Bezold, Ebert, Wagner, Wiener and Exner. The latter, who is the Nestor of this branch of physics, was prevented from attending, but Prof. Elster, of Wolfenbüttel, was present among the experts. Prof. Ebert, of Munich, said that constituents containing electrical charges had been found recently in the air through their physical properties. These carriers of electricity are called "ions," or, more correctly, "electrons." At the earth's surface, their presence may be shown by the dissipation apparatus of Elster and Geitel, and the smallest quantity of electricity may be recorded by means of an electrometer. The speaker had adapted this apparatus for use in balloons, and, by employing an aspirator, a fixed quantity of air could be drawn over the dissipating body and absolute measurements made of the amount of free electricity contained in a cubic metre of air. It is of importance in geophysics to know how the capacity of the air for positive and negative electrons varies with altitude, and therefore the speaker had made such determinations, finding near the earth many more positive than negative electrons, but whether this is a result of the negatively charged earth is uncertain. In the high strata, the inequality tends to disappear, but considerations that throw doubt on the balloon observations relate partly to the electrical discharges produced by the ultra-violet light rays and partly to the indeterminate moment of aspiration in a rising or falling balloon. Prof. Ebert considered the cooperation of aëronauts valuable, and cited as a result of the investigation in the Alps that in the foehn wind an excess of positive electrons is found, and this disturbance of the electrical equilibrium perhaps may cause the foehn sickness. Prof. Elster described two experiments that proved the existence of the electrons, one being the radiation of Becquerel rays after two hours from an insolated and stretched copper wire charged with 2000 volts. It was agreed by both experts that the cleaner and clearer the air the more electrons it contains.

Before closing the Congress, the resolutions proposed, after undergoing certain modifications, were adopted by the committee in executive session, the Congress itself being only a consulting and advisory body. Besides the resolutions mentioned already, it was determined that the international ascents of balloons and kites during the next year should take place, as has been the case this year, on the first Thursday of every month, and that at least one of the *ballons-sondes* liberated at any station should be sent up one hour before sunrise in order that its records may not be affected by solar radiation, and also that the balloon may be seen when it falls to earth in the early morning. The Richard thermograph, with Teisserenc de Bort's insulating device, should be used, and the Hergesell instrument having a tube of German silver, instead of the Bourbon tube filled with alcohol, was also recommended on account of its sensitiveness and durability. Ascensions at other hours and with different apparatus are discretionary. The president, Prof. Hergesell, in summing up the results of the Congress, which he regarded as eminently satisfactory, laid special importance on the meteorological kite flights that were proposed over seas, lakes and mountains, and hoped that the British Government, by similar work in India, would help in the investigation of the great Asiatic monsoon region. A grant of money was requested from the German Government to enable the Prussian Meteorological Institute to cooperate with the writer in his proposed investigation of the atmosphere over the Atlantic Ocean. It was announced that in order to facilitate international researches in scientific aëronautics, the formation of an organisation, sustained by the various European nations, would be attempted.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—AN election will be held at Brasenose College in March, 1903, to an ordinary fellowship, of the value of 200*l.* a year, tenable for seven years, after an examination in the subjects recognised in the Honour School of Animal Physiology. Weight will be attached to work exhibiting research in some subject of physiological study.

The electors to Dr. Lee's readership in chemistry will appoint a reader in January, 1903, and they invite candidates to submit their names and qualifications before January 1. The reader must lecture in two at least of the three University terms, and, in addition to the duties performed for the University, he may be required, as an official student of Christ Church, to take part in the educational work of the house by giving lectures or other instruction in chemistry and directing the work of the chemical laboratory.

Convocation has granted 200*l.* to the Wykeham professor of physics to defray the expenses of fittings for his laboratory.

CAMBRIDGE.—The reader in geography and the lecturers in ethnology and geology have arranged for a series of lectures and practical courses to serve as a training for persons wishing to undertake exploration or desirous of contributing to our knowledge of foreign countries. The series will be held during the Lent term, and will include history of geographical discovery, principles of physical geography, map-making and map-reading, and geography of Europe, by Mr. Oldham; anthropogeography, practical ethnology, by Prof. Haddon; geomorphology and geology, by Mr. Marr; plane-table and photographic surveying, by Mr. Garwood; and elementary astronomical surveying, by Mr. Hinks. The courses will be open to members of the University and others. The fee for all is 3*l.* 3*s.* Further particulars may be obtained from Prof. Haddon, Museum of Archæology, Cambridge.

A syndicate has been appointed to consider what changes, if any, are desirable in the regulations that affect the mathematical portions of the pass examinations of the University, in particular of the previous examination. The members of the syndicate are:—The Vice-Chancellor, Mr. C. Smith, Prof. Forsyth, Dr. Hobson, Mr. W. L. Mollison, Mr. C. A. E. Pollock, Mr. W. Welsh, Prof. G. B. Mathews, Mr. S. Barnard, Mr. W. M. Coates, Mr. E. T. Whittaker and Mr. A. W. Siddons. It is probable that the syndicate will recommend changes analogous to those which have been introduced in connection with the University local examinations, especially as regards the dominance of Euclid.

THE council of University College, Liverpool, has appointed Major Ronald Ross, C.B., F.R.S., to the Sir Alfred Jones chair of tropical medicine and parasitology, recently founded with the aid of special subscriptions to the University fund.

AT a meeting of the general committee of the Principal Viriamu Jones memorial fund, recently held at University College, Cardiff, it was decided to raise a fund of 1000*l.* to erect a statue to the memory of the late principal. To carry out this object and to raise the necessary funds, an executive committee was appointed.

AT a meeting of business men of Manchester and district held on Monday, the Lord Mayor being in the chair, the following resolution was unanimously adopted:—"That the increasing competition and keenness of modern business life and its greater complexity call for a more thorough mental training of persons aspiring to be heads and managers of commercial and industrial establishments, and that this meeting heartily approves of the further development of the higher education bearing on commercial life now provided in the Owens College by the establishment of a Faculty of Commerce on the lines of the draft scheme now submitted."

THE prizes and certificates were presented to successful students of the Northampton Institute, Clerkenwell, on the evening of December 3, by the Lord Chancellor. The principal, Dr. Walmesley, reported a marked improvement during 1901 over the previous year in the number of medals and exhibitions gained in open competition by his students. Before the presentation of prizes, the Lord Chancellor said, in the course of a short address, that suitable technical education would enable the commerce of this country to achieve again the reputation which in some aspects had been diminished in modern times. In this matter, foreigners had been assisted by their Governments and had been provided with educational establishments at the expense of their countries.

THE fifth annual London conference of science teachers will be held on January 9 and 10, 1903, at the South-Western Polytechnic, Chelsea. At the first meeting, the chair will be taken by Mr. Henry Ward, chairman of the London Technical Education Board, and addresses will be delivered by Mr. Usherwood, on the experimental teaching of geometry, and by Mr. Frank Castle, on the teaching of workshop mathematics. Sir William Anson will preside at the second meeting, and addresses on the teaching of geometry will be given by Messrs. S. O. Andrews, W. D. Eggar and A. W. Siddons. Prof. Farmer, F.R.S., will be the chairman at the third meeting, when experimental plant physiology and the rational teaching of botany will be the subjects taken up by Mr. H. B. Lacey and Miss Lilian Clarke respectively. Prof. Callendar, F.R.S., will take the chair at the last meeting, when an address will be given by Mr. Newth on experimental illustration in the teaching of chemistry, and one by Mr. Busbridge on making lantern slides. Free admission to the conference will be granted to as many teachers as the room will accommodate, and application for tickets should be made to Dr. Kimmins, Dame Armstrong House, Harrow-on-the-Hill, or to Mr. C. A. Buckmaster, 16 Heathfield Road, Mill Hill Park.

WE announced last week that the name of Sir John Williams, Bart., had been mentioned in connection with the vacancy caused by Sir Michael Foster's resignation of his seat in Parliament as member for London University. Since then we have received a circular containing the invitation sent by a committee of graduates to Sir John Williams to become a candidate for the vacant seat, and the reply in which he accepts it. After referring to the new conditions of work of the reorganised University of London, Sir John remarks in his reply to the chairman of his committee, Sir J. F. Rotton:—"For the further development of the teaching side of the University and the realisation of our expectations with respect to its work, the creation of schools of original research is necessary. The gifts of generous donors do not and will not suffice to meet the expenses which they will entail, and I am of opinion that such schools form fitting objects of support from the State. Such establishments are a necessity for the growth of that scientific learning which is essential for the progress of trade and the prosperity of the country, as well as for the education of the community. Questions of public health—the prevention of epidemics, the securing of efficient vaccination, the housing of the people, the supply of unpolluted water, the disposal of refuse—engage the attention of Parliament from time to time; questions in the discussion of which the knowledge of those who have been trained in the laws of health and disease, and their application in practice, will prove of great value. To such I would give my earnest attention." Sir Philip Magnus has been asked by an influential body of graduates representing educational institutions to become a candidate for the seat, and has accepted the invitation. Both Sir John Williams and Sir Philip Magnus would give general support to the present Government as Unionists.

THE following announcements of gifts to higher education in the United States have been made in *Science* since the beginning of September:—Mrs. Phœbe Hearst's gifts for archæology and anthropology at the University of California amounted to 111,000 dollars during the last academic year. The University of Pennsylvania has received 100,000 dollars from Dr. E. W. and Clarence H. Clark for a chair in Assyriology, to which Dr. Hilprecht has been appointed. Dr. and Mrs. C. A. Herter, of New York City, have given 25,000 dollars to Johns Hopkins University. Dr. Howard A. Kelly has given 10,000 dollars for an extension of the gynæcological ward of the Johns Hopkins Hospital. Mr. John D. Rockefeller has offered to give 500,000 dollars to Teachers' College, Columbia University, on condition that the sum of 440,000 dollars be collected from other sources—190,000 dollars to pay the outstanding debts and 250,000 dollars for further endowment. The college has received from Mr. and Mrs. B. Everett Macy 175,800 dollars for the increase of the endowment funds and 98,709 dollars for the completion of the Horace Mann School. Princeton University receives 140,000 dollars under the will of the late Mrs. Susan Dod Brown. The bequest to the Princeton Theological Seminary made by Miss Mary Winthrop, of New York, amounted to 1,400,000 dollars. Yale University receives about 171,000 dollars as the residuary legatee of the estate of Mr. E. W. Southworth. The Ohio Wesleyan University receives 150,000 dollars under the will of the late Mr. Francis B. Loomis, of Cincinnati; and Vassar College receives 10,000 dollars by the will of the late Mr. Adolph Sutro, of San Francisco. Clark University will receive the sum of 1,577,000 dollars from the estate of the late Jonas G. Clark. This is in addition to the 500,000 dollars already paid on account of the collegiate department. These gifts and promises cover a period of three months and only include those known to have been made, yet they amount to nearly five million dollars, that is, about one million pounds.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, November 28.—Prof. S. P. Thompson, president, in the chair.—Prof. Perry read a paper on a slide-rule for powers of numbers. Soon after the reading of Mr. Lanchester's paper in 1895—the radial cursor: a new addition to the slide-rule—Prof. Perry made slides to assist in computing m^n, where m and n are any numbers. He then came to the conclusion that no great accuracy was obtainable; but on trying the method again, he has recently found that it is very convenient and sufficiently accurate for gas- and steam-engine work. These computations can be made with a table of values of log (log m) used in conjunction with an ordinary table of logarithms. In the rule exhibited, the D line is replaced by a scale such that the distance from the mark 10 to the mark m represents log (log m) to the same scale of measurement as that to which the distance from 1 to n on the C scale represents log n. The values of m range from 2 to 1000, and those of n from 1 to 10 or from 1 to ·1 used backwards. The author showed how, with one operation, the rule could be used to find the value of $m^{\frac{a}{n}}$, $m^{\frac{1}{n}}$, and the logarithm of any number to any base. If the answer on scale D is less than 2 or greater than 2000, or if the exponent n is negative, indirect methods involving two operations are necessary. Prof. Perry has replaced the ordinary D line by the log log scale, because in his opinion this line is the one least used by workers with the slide-rule. The use of the log log scale was described by Roget in 1814, and the author's object in bringing the matter forward lies in the fact that